

## MONITORING APPENDIX

### INTRODUCTION

For each resource there are a series of items that will be monitored. Each item is evaluated by location, technique for data gathering, unit of measure, and frequency and duration of data gathering. When duration is not specifically stated, the duration is for the next 20 years. The monitoring and evaluation plan states the event that will be

evaluated and lists the key resources that will be managed by the Big Dry Resource Management Plan and Environmental Impact Statement. If an adverse impact can be corrected by a management action within the scope of this plan, the change will be implemented. If the adverse impact can be corrected only by a management action that is outside the scope of this plan, the management change will be a formal amendment.

**TABLE 58**  
**MONITORING AND EVALUATION PLAN**

Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Information Warranting a Decision Change
<b>AIR QUALITY</b>	air	Terry Badlands	filter pack and pump	parts per million	monthly	samples show high concentrations, BLM will be notified by the National Biological Survey and will investigate and make recommendations for mitigation
<b>CULTURAL RESOURCES</b>	areas of critical environmental concern	areawide	site inspection	site and surrounding area	bimonthly between April and November	any noticeable trend indicating increased disturbance - natural or caused by man
	20 percent of National Register eligible sites	areawide	site inspection	site and surrounding area	annually	any noticeable trend indicating increased disturbance - natural or caused by man
	1 percent of remaining total of sites	areawide	site inspection	site and surrounding area	annually	any noticeable trend indicating increased disturbance - natural or caused by man
<b>MINERALS</b>						
<b>Oil and gas</b>	geophysical Notice of Intent	areawide	line inspection	operations conducted in compliance with Notice of Intent	minimum of once during operations	violation of regulations, change from approved Notice of Intent, unnecessary or undue degradation

geophysical Notice of Completion	areawide	line inspection	operations conducted in compliance with Notice of Intent	minimum of once during plugging and once after reclamation	violation of regulations, change from approved Notice of Intent unnecessary or undue degradation
Application for Permit to Drill drilling	areawide	site inspection	operations conducted in compliance with Application for Permit to Drill	minimum of once and as necessary	violation of regulations, change from approved Application for Permit to Drill
Sundry Notice	areawide	site inspection	operations conducted in compliance with the Sundry Notice	as necessary	violation of regulations, change from approved Application for Permit to Drill, unnecessary or undue degradation
produced water disposal	areawide	site inspection	operations conducted in compliance with permit	minimum of once annually	violation of regulations, change from approved permit, unnecessary or undue degradation
spill	areawide	site inspection	area cleaned up and reclaimed	minimum of once after event	violation of regulations, change from approved permit, unnecessary or undue degradation
plugged and abandoned wells	areawide	site inspection	operations conducted in compliance with permit	minimum of once during operations	violation of regulations, change from approved permit, unnecessary or undue degradation

TABLE 58 (continued)  
MONITORING AND EVALUATION PLAN

Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Information Warranting a Decision Change
	abandoned well reclamation	areawide	site inspection	operations conducted in compliance with permit	minimum of once and as necessary until reclamation complete	violation of regulations, change from approved permit, unnecessary or undue degradation
PALEONTOLOGY	locality degradation caused by human activity	significant paleontologic localities and areas of critical environmental concern	inspection of area disturbed	percentage of locality	once yearly	any noticeable trend indicating increased disturbance such as excavations
	environmental degradation, such as erosion or trampling	significant paleontologic localities and areas of critical environmental concern	inspection of displaced or altered area	number of fossils	once yearly	accelerated loss or damage to significant fossils
RECREATION	general recreation use	areawide with emphasis on dispersed use of undeveloped recreational sites	area inspection to look for vandalism, resource abuse, and install photo points	site condition	twice a year (e.g. once in June and once in October) - photograph annually	user conflicts, resource degradation, or safety hazards
	concentrated recreation use and demand	special recreation management areas and sites with recreation facilities	visitor registration, traffic counters, estimates, and photo points	visitor days, site condition	visitor registration boxes and counters checked once monthly at the minimum and weekly or biweekly during heavy use periods, photograph annually	increased visitor use/year or sustained use that requires additional or improved facilities

		areawide commercial and competitive activities	administrative review and site inspection for complexes with permit stipulations	permit stipulations, resource condition, success of reclamation	on site during competitive events, periodic site inspection for commercial operations, administrative review annually	violation of permit stipulations, irreparable resource damage, compromise of visitor safety and recreation experience
SOIL AND WATER						
Soil and site productivity	compaction	Tertiary Age volcanic soils which will be and have been disturbed	use of proving ring pentrometer <sup>1</sup>	pounds per square inch	twice a year over a 5-year period	when compacted areas exceed 10 percent of ground surface and do not recover through natural processes within 5 years
	soil moisture	selected fine-grained volcanic soils, coarse-grained soils	manual sampling and gravimetric <sup>2</sup> analysis	percent by weight	once monthly June through September	when regeneration is impaired due to inadequate soil moisture induced by management practices
Water	water quality	areawide - where management activities are occurring or to expand baseline data	standard U.S. Geological Survey methods (or modified to meet specific conditions) - field and laboratory analyses done for selected stream basins that have continuous discharge measurements (April through September or runoff period) - automated suspended	standard quantitative measurements of discharge for water quality	field measurements 10 to 15 times per year, base line data collected for 5 years prior to disturbance activities in basins without prior data - monitoring will continue throughout the activity period and up to 4 years following completion of activities	water quality parameters which exceed state of Montana water quality standards - water quality measurements, especially suspended sediments, which render the water unsuitable for its classified usage

**TABLE 58 (continued)**  
**MONITORING AND EVALUATION PLAN**

Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Information Warranting a Decision Change
VEGETATION			sediment sampling and continuous temperature measurements will occur in selected streams (April through October)			
	actual use	all existing allotment management plans and allotments within 3 years of allotment management plan development	actual use report submitted by livestock operation	time, location, numbers and type of livestock use	annually for all allotment management plans, others as needed	actual use exceeds acceptable levels
	climate	all existing allotment management plans and allotments within 3 years of allotment management plan development	National Oceanic and Atmospheric Administration report (1992) and site specific rain gauges where needed	precipitation (amount and intensity) ranges, temperature	monthly during the growing season	extremes considered a factor
	ecological status	all allotments; top priority to allotment management plans "I" and "M" allotments	ecological site method in key areas	composition and production compared to potential natural community for each site	updated when allotment is evaluated - grazing cycle to 10-year cycle	status is reduced by 15 percent or a drop in class

	trend	all allotments, top priority to allotment management plans, proposed adjustments to preference “I,” “M,” then “C”	density, cover, frequency, and comparison of species composition over time as described in TR 4400-4 and the National Range Handbook	number of individuals per unit area, percent cover, percent frequency, and percent species composition	“T” category AMPs every grazing cycle or 5 years. “M” category AMPs every grazing cycle or 10 years. “I”, “M”, or “C” category allotments without an AMP every 10 years or less.	a change in the direction of trend away from management objectives
	utilization or carry over	allotments within 3 years of allotment management plan development as needed to meet management objectives	key forage method	percent of the forage left	annually with proposed allotment management plans otherwise as needed	utilization of desired plants exceeds desired use levels
	noxious weeds	“M” and “I” allotments	map location and estimate density	acres and plants per square feet	every 5 years	10 percent increase beyond objective for the area
<b>Riparian/wetlands</b>	condition, trend, age class structure, streambank alteration, streambank stability, stubble heights, and utilization.	“M” and “I” allotments with activity plans and potential for woody riparian vegetation	photo plot, estimate key areas by sight inspection, Cole Browse Method, Key Forage Method, and other methods found in Technical References (TR4400-3, TR4400-4, TR4400-7, TR1737-3, TR1737-8, and TR1737-9).	percent species composition, percent in each age class, percent utilization, height, percent of the streambank.	based on activity plan schedule - a minimum of once every 5 years	trend away from objective or when no improvement occurs, in unsatisfactory habitat condition

TABLE 58 (continued)  
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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Information Warranting a Decision Change
<b>WILDERNESS</b>	wilderness study areas	Seven Blackfoot, Terry Badlands, Musselshell Breaks, Billy Creek, and Bridge Coulee Wilderness Study Areas	monitoring by flight, vehicle, or foot based review	surface disturbance	once a month if the area is accessible unless an alternate schedule is approved by the State Director	whenever an authorized action is in violation of the stipulations or Interim Management Policy or whenever an unauthorized action occurs - decision may required reclamation or possible civil or criminal action and public notification
<b>WILDLIFE</b>						
<b>Big game</b>	condition and trend	big game crucial winter range	use of Coverboard <sup>3</sup> and Cole browse <sup>4</sup> utilization	percent use of available annual growth	tied to allotment management plan, coordinated resource management plan, or habitat management plan objectives- studies conducted at the end of the grazing season or at the end of the winter, early spring (March through May), and other uses as needed	objectives for big game habitat not being met
	seasonal habitat use	big game crucial winter ranges	aerial surveys - using a global <sup>5</sup> positioning system or pellet group indices	distribution of big game animals and use	when winter conditions are such that animals are concentrated on the winter ranges	objectives for big game habitat are not being met

<b>Fisheries habitat</b>	habitat condition and trend	fishing reservoirs	test for dissolved oxygen, alkalinity - other tests as needed	parts per million	annually, or as needed	change in water quality resulting in damage to fish population or carrying capacity
	species and numbers	fisheries reservoirs, creeks, and rivers	test area with net for species, occurrence, growth and density	number and types of fish	3 to 5 years or as requested by Montana Department of Fish, Wildlife and Parks (June through August)	change in species could require poisoning - lack of adequate production could require change in species planted
<b>Nongame habitat</b>	use	raptor reproduction sites	nest site visitations and route surveys	number of birds or occupied nests	annually for the route surveys (early spring) and every 5 to 10 years for nest site monitoring	downward trend in production or occupancy
		breeding bird survey routes	field survey routes	number of birds	once annually, or as needed	3 year downward trend in occupancy
<b>Threatened and endangered species habitat</b>	habitat use and trend	black-tailed prairie dog colonies	black-footed ferret habitat - the prairie dog colonies will be monitored for size and for burrow density	acres and number of prairie dog colonies and burrows per acre	complexes of 1,000 acres or greater will be monitored every 5 years	deterioration in the colonies size that would make the area unacceptable for further consideration for black-footed ferret reintroduction
		least tern nesting sites on the Yellowstone River	the Yellowstone River will be floated and historic nesting sites monitored for number of adults, and young or nests observed	number of sites and least terns	historic sites will be monitored annually for use -other suitable habitat will be monitored every 3 to 5 years for the possible expansion of nesting colonies (June through August)	1 to 3 years downward trend in production or occupancy

TABLE 58 (continued)  
MONITORING AND EVALUATION PLAN

Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Information Warranting a Decision Change
		pipng plover nesting sites	historic nest site will be monitored for number of nesting pairs and nest and young	number of piping plovers, nests, and number of sites	every 1 to 5 years - depending on the recommendations of the piping plover working group (May through July)	1 to 3 year downward trend in production or occupancy
		bald eagle reproduction and wintering sites	by aerial or boat or field surveys	number of sitings	as bald eagles continue to expand their nesting territories east and as nests are located on BLM land - monitor for reproduction (mid-March through July) - winter roost sites (December 1 through February)	1 to 3 year downward trend in production or occupancy
Upland game	use and trend	sharp-tailed and sage grouse leks	field inspect leks	number of males	rotation will be developed where leks will be monitored on 3 to 5 year rotation - key leks could be monitored 1 to 2 years (March 15 to May 15)	Downward trend (1 to 3 years) when compared to other leks in the study area that show a stable or upward trend
	condition	sharp-tailed and sage grouse nesting habitat	coverboard Daubenmire <sup>6</sup>	height of residual vegetation	monitoring will be tied to allotment management plan, habitat management plan, or coordinated resource management plan objectives (after the grazing season)	objectives for upland game habitat not being met

Waterfowl	use	wetland habitat	spring and summer brood counts	number of broods, young per brood	tied to habitat management plan, coordinated resource management plan, or allotment management plan objectives - highest value wetlands monitored annually May to July	1 to 3 years of downward trend
	habitat condition	wetland vegetation and nesting habitat	coverboard	height and amount of residual vegetation	tied to habitat management plan, coordinated resource management plan, or allotment management plan objectives (end of the grazing season)	1 to 5 years of downward trend

<sup>1</sup> A device used for measuring soil compaction.  
<sup>2</sup> The measuring of specific gravities of solids, liquids, or gases.  
<sup>3</sup> A measurement board used in photographing the growth of vegetation.  
<sup>4</sup> Measuring the shrub to evaluate use by big game.  
<sup>5</sup> Pinpoints locations by utilizing satellites.  
<sup>6</sup> A method of utilizing a transect to monitor vegetation trend.